

What Is Claimed Is:

1. A stair lift for lifting and lowering at least one person on a rail on a stairway, the stair lift comprising:

5 a carriage mountable to said rail, said carriage having a track engaging drive, and a motor to power said drive, said powered drive causing said carriage to move along said rail;

a central support post mounted on said carriage;

10 an offset arm connected to said seat support post, said offset arm being mountable to said carriage in one of a left side or a right side position;

a seat mounted on said offset arm, and

15 a means for angularly securing said seat in position on said offset arm in either said left side or right side position and for selectively releasing said seat to permit said seat to swivel between an upward facing position and a sideways facing position on said offset arm to facilitate said person getting into and out of said seat.

2. A stair lift as claimed in claim 1 wherein said stair lift includes said rail and said rail comprises a track portion and a structural portion.

20 3. A stair lift as claimed in claim 2 wherein said structural portion is a hollow section having side channels and said carriage has wheels which ride in said side channels.

25 4. A stair lift as claimed in claim 3 wherein said carriage further includes bearings adjacent to said wheels.

5. A stair lift as claimed in claim 4 wherein said rail is comprised of two or more sections joined end to end.

30 6. A stair lift as claimed in claim 5 wherein said rail further includes a race

for electrical wires.

7. A stair lift as claimed in claim 6 wherein said rail sections are joined together by connectors, said connectors being sized and shaped to draw abutting edges of said rail sections into tight contact.

8. A stair lift as claimed in claim 7 wherein said rail section includes a channel for retaining a switch trip element.

9. A stair lift as claimed in claim 8 further including a switch trip element housed within said channel to trip switches on said carriage to control movement of said carriage along said rail.

10. A stair lift as claimed in claim 2 wherein said rail includes a track retaining profile on said upper surface and said track is slidable retained in said track retaining profile.

11. A stair lift as claimed in claim 10 wherein said track comprises a row of teeth mounted to an upper surface of said rail.

12. A stair lift as claimed in claim 11 wherein said teeth are formed into discrete track sections, which abut end to end to form said row of teeth having a substantially even spacing of teeth along said track.

13. A stair lift as claimed in claim 12 wherein said teeth track sections are formed from molded plastic.

14. A stair lift as claimed in claim 13 wherein said track sections further include a reinforcing element to reduce the displacement of said teeth under loads.

15. A stair lift as claimed in claim **14** wherein said reinforcing element does not extend fully to the ends of each of said track section.

5 16. A stair lift as claimed in claim **14** wherein said rail includes a clamping element to apply an axial load along said track sections.

10 17. A stair lift as claimed in claim **15** wherein said track sections are formed with a larger gap between the teeth at the ends of each abutting track section than the gap between the teeth located inwardly of the ends, and said clamping element applies enough compression to said track sections to compress said larger end gap to the same dimension as the gap between the other teeth.

15 18. A stair lift as claimed in claim **1** wherein said central support post is pivotally mounted at a pivot point to said carriage.

20 19. A stair lift as claimed in claim **18** wherein said seat support post includes a fastener to lock said seat support post at a given angle relative to said carriage.

25 20. A stair lift as claimed in claim **19** wherein said seat support post is in the form of a single post above said pivotal mounting and is in the form of a forked element below said pivot point, wherein said seat post can extend down around a motor located within said carriage.

21. A stair lift as claimed in claim **1** wherein said carriage includes a worm gear drive and said motor drives said worm gear drive in two directions to permit said carriage to move in opposite directions along said rail.

30 22. A stair lift as claimed in claim **21** wherein said worm gear is formed from plastic.

23. A stair lift as claimed in claim **21** wherein said carriage includes limit switches to control operation of said motor.

5 24. A stair lift as claimed in claim **23** wherein said carriage includes at least three limit switches, one at a time of two to slow said carriage, and the third to stop said carriage as said carriages approaches an end of said rail.

10 25. A stair lift as claimed in claim **1** wherein said carriage includes a manual motor switch to activate said motor to facilitate the installation of said carriage on said track.

15 26. A stair lift as claimed in claim **1** wherein said carriage further includes a foot rest which can be placed over said seat support post in one of a left side and right side position.

20 27. A stair lift as claimed in claim **26** wherein said foot rest covers said manual motor switch to prevent access to said switch once the carriage is installed.

28. A stair lift as claimed in claim **1** wherein said offset arm is sized to permit said rail to be mounted closely adjacent to a side of said stairway, without said seat interfering with a side wall thereof.

25 29. A stair lift as claimed in claim **1** wherein said seat includes at least one offset mount for mounting said seat on said offset arm.

30 30. A stair lift as claimed in claim **29** wherein said seat includes at least two mounts for said offset arm, with at least one one located at either side of said seat wherein said seat may mounted in either a left hand or a right hand

configuration.

31. A stair lift as claimed in claim 1 wherein said a means for angularly
securing said seat in position on said offset arm comprises a notched plate
5 and a moveable cam sized and shaped to engage said notches mounted
between said seat and said offset arm, wherein said moveable cam can
selectively engage said notches to fix said seat in position.

32. A stair lift as claimed in claim 31 wherein said notched plate is fixed to
10 said post and said moveable cam is mounted to said seat.

33. A stair lift as claimed in claim 32 wherein said moveable cam is
manually accessible from said seat to permit said person to easily lock and
unlock said seat.
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34. A stair lift as claimed in claim 33 wherein said seat further includes
limit switches, where said motor is disabled if said seat is free to swivel and is
engaged if said seat is locked in the one correct position facing the center of
the stair.
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35. A stair lift as claimed in claim 1 wherein said carriage includes contact
switches to disable said motor if said carriage contacts an obstacle.

36. A stair lift as claimed in claim 1 wherein said motor is an battery
25 powered electric motor, wherein said batteries are contained in said carriage,
and said carriage includes electrical contacts for connecting to a power
supply to recharge said batteries when said carriage is at an end of said rail.

37. A stair lift as claimed in claim 36 wherein said rail includes a mount for
30 mounting a recharging contact to said rail, wherein said recharging contact is

positioned to be contacted by said carriage when said carriage is at an end of said rail.

38. A stair lift as claimed in claim **37** wherein said mount is located at either end of said rail to recharge said motor whether said carriage is left at the top or the bottom of the rail.

39. A stair lift as claimed in claim **38** wherein said mount comprises a channel on either side of said rail for inserting a respective positive and negative contact.

40. A stair lift as claimed in claim **39** wherein said channel for said positive contact is different from said channel for said negative contact, wherein only said proper contact may be placed into the mount.

41. A stair lift as claimed in claim **40** wherein said channels are formed along the length of said rail wherein said rail may be trimmed to length without affecting access to said mount.

42. A stair lift as claimed in claim **1** wherein said rail is a hollow extruded section which can be trimmed to length.

43. A stair lift as claimed in claim **42** wherein said rail is formed from aluminum.

44. A stair lift as claimed in claim **42** further including one or more feet for securing the rail to a stairway.

45. A stair lift as claimed in claim **1** further including a level to aid in orienting said seat post in a vertical orientation about said pivot point.

46. A stair lift as claimed in claim **45** wherein said level is sized and shaped to fit on top of said seat post before said offset arm is attached.

5 47. A stair lift as claimed in claim **1** further including a disposable ramp for guiding said carriage onto said rail when installing said carriage on the rail.